II. SAMPLE CULTURE CONTROL

Approved: 10/96

CYTOGENETICS IX - QUALITY CONTROL

Quality Control Policies

1.Director Review. The director reports the results of the tests performed in the laboratory and is cognizant of the reason for requesting the test and for the quality of work performed in the laboratory.

2. Maintenance of Equipment. There should be preventive maintenance and repair of the equipment as needed. Preventive maintenance on each piece of equipment includes maintaining the equipment in a clean manner, documentation of the equipment history, and records as to when the instruments are cleaned and how.

3.An Operator's Manual is available in a notebook on all instruments used in the laboratory.

4.Temperature records are maintained on the outside of the refrigerator-freezer and incubators (reviewed monthly by lab supervisor).

5.Personnel in the laboratory are trained to clean the photomicroscope and when a malfunction occurs, an appropriate representative is called to repair the faulty equipment.

6.Electrical outlets for grounding and safety are checked once each year by the safety director.

7.The output of ultraviolet lamps in the Forma Biological Safety Cabinet is checked annually by the UTMB Office of Environmental Health and Safety. Readings exceeding 40 microwatts/cm^2 are considered acceptable. The readings are posted on the front of the safety cabinet. Overall sterile hood function is tested annually by Hepa

Tech, Inc.

8.Fyrite CO_2/O_2 readings are made twice weekly and compared to LCD readouts on the Forma incubators.

All lab personnel are responsible for monitoring, cleaning, and recording what is done to all equipment in use. The Supervisor reviews this record every 4 months.

For service/information on our equipment, the following persons are contacted:

Jouan (centrifuge):800/621-2454
Wayne Tondro, Forma (incubator, hood):800/634-1515

Microscopes:	Brian Mann, Leitz:	713/445-7007
	Stu Levy, Nikon:	713/734-7896
UTMB Biomedical Electronics: (other equipment)		409/761-3750
MTS		800/356-7726
Hepa Tech, Inc.		713/326-6023

Quality control checks on specific lots of tissue culture media, serum, etc., that we order are available from the following:

Sigma :	800/325-3010
Life Technologies, Gibco/BRL:	800/828-6686

In March, 1995, the incubators went on a maintenance contract through UTMB's Biomedical Engineering and Electronics Dept.

Approved: 11/15/96

Checklist for Equipment Folder

(Each Equipment Folder will have the following checklist.)

Date in Service:_____

Serial #_____

1. Equipment operators instruction manual:_____
2. Routine maintance records (appropripate for instrumentation)
   a. Annual _____
   b. Monthly_____
   c. Daily _____

3. Repair Summaries with Receipts:_____

4. Review Date:
   Quarter 1:_____

   Quarter 2:_____

   Quarter 3:_____

   Quarter 4:_____

Date Retired:_____

Approved: JM 10/96

QUALITY CONTROL

Records

A ring binder notebook entitled "Quality Control Checks-Media, Reagents, FBS" is maintained, and the performance of each new lot, as compared to the previous lot, is recorded as "+" (good) or "-" (poor). We tend to stick with one vendor for a particular item for a long time and find that the variance in quality from lot to lot is negligible.

We keep quality check records on the following items in particular in this log binder: sodium heparin, colcemid, Enzar T trypsin, PHA, CDM, Amnio MAX-C100, FBS, RPM1 1640, M199, HBSS(1X, powdered), L-glutamine, and penicillin-stretomycin. Also, kept in this log are Certificates of Analysis from the vendor.

Media and Solutions

1. The media and components used in this laboratory for cultures are purchased from reputable companies. These products are pretested and strict quality control is done before the products are released for use.
2. Sterility testing is performed on each new lot number of Fetal Bovine Serum, Amnio-Max C100, RPMI 1640, and CDM. See the procedure for Quality Control-Sterility Testing. The media used for blood and bone marrow cultures is not tested for sterility. Blood and bone marrow cultures are a relative "short term" culture.
3. Any solutions or media that have a visible change in pH are discarded. The media (A.F. Media) used for tissue and amniotic fluid cultures is discarded if it is older than 7 - 10 days.

Quality Control of Cultures

1. Blood and bone marrow specimens are set up using at least four tubes.
2. Amniotic fluid and tissue specimens are set up using at least two culture flasks. In addition to the two flask minimum, each culture flask is set up and maintained with different bottles of media and components. The A.F. Media used is prepared from different lot numbers (if possible) and by different technologists. In addition,

they are also maintained in different incubators. Example: Half of the cultures are kept in CO_2 incubator A and the others in CO_2 incubator B. This reduces the chance of contamination occurring in both cultures.

3. Strict labeling procedures are performed throughout every phase in the study and test. The use of the name, date, and accession number are mandatory.

Quality Control of Prepared Solutions and Reagents

1. All reagents used in the laboratory must be properly labeled, dated, and stored.
2. Solutions prepared in the laboratory must be dated and initialed by the technologist preparing them (include both preparation and expiration dates).
3. A chart of recommended G-banding times of that particular day, i.e., trypsin and Giemsa times, is posted at the banding station. An unneeded or surplus slide is the test subject.

Quality Control of Testing and Results

1. Harvesting is performed on at least two culture flasks on each patient. This is automatically performed on blood and bone marrow cultures.
2. The counts and analyses of the mitoses are done on a minimum of two slides.
3. A minimum of 15 cells is counted and at least two karyotypes are done.
4. If the mitoses present are not of acceptable quality, then a repeat specimen is required.

References

1. Priest, Jean. Cytogenetics, Medical Technology Series, Ch. I, Lea and Febiger, 1969.
2. Nagel, J and Kunz, L.J. Needless Retesting of Quality-Assured, Commercially Prepared Culture Media. Appl. Microbiology 26:31-37, 1973.
3. Bailey and Scott. Diagnostic Microbiology. Ch. 40, 5th edition, Mosby and Co.,1978.

ANALYSIS OF CULTURE FAILURES

Our objective is to do a complete chromosome analysis on every sample received. If that is not possible to determine if the failure was do to factors under our control.

Peripheral Bloods*

I. Failure of all cultures.

A Check media for pH and sterility. Check QC log book to make certain the lot number was tested and found to be contamination-free and supported growth and to see if any comments were made.

B. Check incubator temperature.

C. Check technical procedure.

II. Failure of individual culture.

A. Review of individual culture.
1. Was the sample adequate in amount?
2. Was the proper anticoagulant used?
3. Was it over-heparinized?
4. Was the specimen contaminated?

B. Specimen handling.
1. Was it cultured promptly? If not, how long was the delay?
2. Was the specimen kept at room temperature, or exposed to heat or low temperatures?
3. Was the specimen contaminated?

C. Condition of the patient.
1. Was the patient expired or alive at the time of specimen collection?
2. Was the patient on medication?
3. Was the patient's peripheral lymphocyte count adequate? Were the lymphocytes T-cells?

III. Repeat cultures.

A. If the specimen is felt to be adequate and was handled properly, use it to set up a second culture.

B. If the specimen is felt to be poor or was mishandled, or if the second culture of an adequate sample fails, ask for a new specimen. Review the proper technique with the doctor.
C. If repeated cultures fail:
1.If patient is on medication, ask for a new sample when drug has been discontinued.
2.Suggest a different kind of sample, such as bone marrow or skin fibroblast, if a dysfunction of the T-cells is suspected or peripheral lymphocyte count is inadequate.
3.If the patient expires, ask for kidney or lung tissue at the time of autopsy.

Bone Marrow*

I. Culture failures are usually due to:
A. Inadequate sample
B. Intrinsic inability of the leukemic cells to divide in-vitro
D. Drug therapy

II. Check culture system for media function, incubator temperature, technical procedure.

III. Repeat cultures:
A. If the specimen is felt to be adequate, new cultures may be set up using an altered amount of sample and/or altering the growth time.
B. Request a new sample if the first specimen was inadequate and if therapy has not yet been instituted.

Amniotic Fluids*

I. Since amnios are done in triplicate using two different batches of media and incubated in separate units, most culture failures are due to inadequate sampling.
A. Insufficient amount
B. Contaminated specimen
C. Urine sample

II. If an individual culture fails or all cultures using the same media and incubation conditions fail:
   A. Check media for contamination and pH. Check QC log book to makecertain the lot number was tested, found to be
   B. Check incubator temperature and CO_2 content.

III. If all cultures fail:
   A. Check technical procedure
   B. Check function of laminar flow hood

IV. Report cultures:
   A. If growth failure or is scanty, alert physician within seven days that growth is poor and a new specimen may be requested.
   B. Ask for a new specimen in 10 days if growth failure continues.
   C. Ask for a new specimen immediately if there is a failure of the culture system.

Skin Fibroblasts*

I. Given that the culture conditions were correct, most culture failures are related to specimen collection and handling. There will be poor or no growth if:
   A. The specimen was contaminated at the time it was taken or if it was placed in a non-sterile container.
   B. The specimen was placed in an improper transport solution, such as formalin.
   C. The specimen was exposed to temperature extremes; refrigeration is okay.
   D. The type of specimen is incorrect, such as fat, necrotic tissue.
   E. There is a delay of more than 72 hours in getting the specimen into culture.

II. Failures may also be related to technical procedure if:
   A. The specimen is not minced finely enough.
   B. The minced specimen is covered with too much media, not allowing good attachment of the cells to the flask surface.

Approved: _____

*All culture failures must be documented in the Exceptional Cases Manual and tissue culture log books and evaluated monthly by the director or concerned others. "Culture failures" is one of our critical values indicators, as outlined in the Critical Values section of this manual.

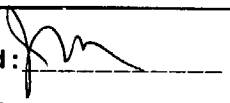
TISSUE CULTURE DECONTAMINATION MEASURES

Our policy is to discard all contaminated materials as soon as possible due to the highly infectous nature and the possibility of cross contamination. Exceptions to this rule is amniotic fluid samples and certain SK/POC samples as identified by the director.

All cases of contamination are to be noted and included in the exceptional case report log.

Amniotic Fluid and SK/POC Cultures

1.Work in Labconco hood. Pipet, don't pour.
2.Discard contaminated medium into waste beaker containing bleach.
3.Rinse cells in flask 2X in 3-5 ml decontamination MEM.
100 ml Irvine MEM (#9126)
0.2 ml Gentamycin (Sigma #G1014, 50 mg/ml)
0.5 ml Nystatin (Sigma N1638; 10,000 units/mL)
Sterile filter
4.Add fresh culture medium to flask.
5.Can also put new cap on flask.
6.Incubate in blood incubator.
7.Wipe glass door and shelves of original incubator with diluted Roccal then 70% ethanol. Can also wipe uncontaminated flasks there.
8.Put new Roccal solution in pan.
9.Use fresh bottles of IX Hanks, trypsin EDTA, etc., for subsequent manipulations.
10.Make entry into patient's daily tissue culture log.
11.Repeat above if contamination reappears.
12.Can do emergency harvest if flask ready.

Approved: 

QUALITY CONTROL - STERILITY TESTING

Products Tested

1.Fetal Bovine Serum (Gibco 16000-044)
2.Amnio-Max C100 (Gibco 17001-058, 17002-015)
3.RPMI 1640 (Irvine 9160 and Gibco 21870-050)
4.CDM (Sigma C8197)

Procedures

1.Randomly select a bottle from the new lot number.
2.Using a sterile technique (laminar flow hood) place 5 ml of the product in a sterile plastic culture flask. Label the flask with the product name and lot number.
3.Incubate the flask in the CO^2 incubator for 96 hours.
4.Using the inverted microscope (high power) check the flask for contamination. If there is no growth (contamination) then the lot number can be utilized. If contamination is present then repeat Steps 2, 3, and 4 on another bottle from the same lot number.
5.If the lot number appears to be contaminated, then the culture flask containing the product should be taken to the Microbiology laboratory for a culture and identification of the organism.
6.The company that the product was purchased from should be notified of the findings and a new lot number can be reordered. In addition, the contaminated product should either be discarded or sent back to the company, depending on the recommendation of the company. Under no circumstances is the contaminated lot number to be used.
7.The form for Sterility Testing is to be filled out with the appropriate information.
8.Results to be reviewed monthly by lab supervisor.

Reference

Bailey and Scott, Diagnostic Microbiology, Ch. 40, 5th edition, Mosby and Company, 1978.

Approved:

SAFETY POLICY ON HANDLING AND DISPOSAL OF SHARP OBJECTS THAT HAVE BEEN IN CONTACT WITH BODILY FLUIDS, TOXIC REAGENTS

Warning:
Wear gloves when handling potentially hazardous substances. Double-glove when patient's sample is known to be HIV+, hepatitis+, etc.

1.When setting up BL or BM sample, pull original needle off syringe with a pair of pliers.

2.Dispose of empty syringe with needle on it in a Sharps container. Do not attempt to recap needle with needle guard.

3.Dispose of capped old syringes containing blood in a closed Sharps container and place in red biohazardous waste bag.

4.Dispose of Pasteur pipets used in culturing and harvesting in Sharps container.

5.Be very careful when placing new blade on scalpel. Remove used blade from scalpel with instrument other than your finger (e.g., pair of pliers). Dispose of blade in Sharps container.

Approved: _____

GLOVE USE GUIDELINES

1.Wear gloves when handling all patient samples or biohazardous chemicals.

2.Make sure gloves fit properly.

3.Replace gloves if they are torn or contaminated.

4.Don't re-use gloves.

5.Double-glove for known hepatitis positive or HIV positive samples.

Approved: JM 10/96

STERILE GLASSWARE /GLASSWASHING

1. The majority of our containers are disposable. These include culture flasks, pipets, and storage containers which come presterilized.
2. A few items are reused e.g. primarily, graduated cylinders, beaks for mixing and Coplin jars for staining.Glass culture bottles are now washed in GE automatic dishwasher with Alconox detergent. Rinsed manually several times in DI water and allowed to drip-dry.
3. A Soap test is perfomed on each set of washed dishes. The data is is saved. (Sulfobromophthalein, Sigma S-0252)
   a. A one drop of filter-sterilized 1% soap tester is placed in a washed bottle filled with deionized water.
   b.Purple coloration indicates the presence of soap.
4. If sterilization is required, 'The UTMB Sterile Processing facility' sterilizes our glassware.
5. If at all possible, store sterilized material in a separate cabinet from other glassware. If not, keep in a relatively dust-free area. Vials and bottles may be capped before storing but do not place stoppers in tubes until right before use.

Approved: 10/96

Biological Monitoring System (OBTAINED from Sterile Processing) Reviewed 11/93

Policy

A test packs with a biological indicator containing Stearothermophilus Bacillus will be run in each steam sterilizer every morning. A test pack with a biological indicator containing Bacillus Subtillis will be run in each gas sterilizer every morning and a biological indicator will be run in all other gas loads.

Procedure

The biological indicator will be done each morning in the "Test Pack" of every sterilizer. The biological indicator will be run once a day in the steam sterilizers and in every load of the ethylene oxide gas sterilizers.

The test pack will be removed from the steril1zer, then biological indicators will be removed from the "Test Pack" to be allowed to cool for 10 minutes. Crush the biological indicator and place in the proper incubator for 48 hours. The biological indicator will be examined at the end of 24 hours for evidence of bacterial growth. If no growth is noticed it will remain for another 24 hours. If the test is beginning to show bacterial growth, action will be taken to pull all supplies that had been run in that load.

Instructions

Biological indicators for the steam sterilizer will be marked with the autoclave number and the load number. It will then be placed in the "Test Pack". Place the "Test Packs" in the most difficult location for steam to reach. Sterilize. When the cycle is complete and the load is cool and dry, recover the "Test Pack" and retrieve the biological indicator. Take the indicator out of the "Test Pack", crush and place in the incubator.

The biological indicator for gas sterilizer will be stamped with the autoclave number and load number and it will be placed in the "Test Pack". Place gas biological indicator in the most inaccessible location for ethylene oxide, temperature and humidity to reach. Sterilize. When the cycle is complete, remove the "Test Pack" and retrieve the biological indicator.

Crush the vial to activate the indicator, place in the incubator.

Approved: 10/96

OBTAINED FROM STERILE PROCESSING
Subject: RECEIVING, CLEANING AND PREPARING SUPPLIES

Policy

Apply efficient sterilization and decontamination processing procedures for all sterile processable supplies in order to create a safer and cleaner environment for patients at U.T.M.B. hospitals.

Procedure

All items brought to sterile processing for sterilization will be received in the decontamination area. Each item will be checked to see if it is in good working order and to see that all trays, etc., are complete. All items will be washed by hand, run through the sonic washer or washer sterilizer, and soaked in instrument milk. These items will then be sent to the clean area.

The personnel in the clean area will refer to the tray book to put up all trays and supplies. These trays and supplies will be assembled according to procedure. The trays will be double wrapped in a double muslin wrapper. All trays will have a chemical indicator inside the package and will be taped with indicator tape. All trays will be labeled clearly and stamped with the loadacator gun which indicates the control number. A loadacator card with all areas listed and the control numbers recorded will be put in each load of supplies to be sterilized. The items will be itemized on an autoclave load record, which is stamped with the same control number.

This complete record system enables Sterile Processing to check any item in the event we have any difficulties.

Use of Protective Barriers

The decontamination area will use protective barriers at all times. Protective barriers include gloves, gowns, masks, and protective eye wear.

WATER POLICY

QUALITY OF WATER

The laboratory has defined the reagent grade of water necessary for each of its procedures, and maintains an adequate supply of reagent water. Reagent grades, as defined by the National Committee for Clinical Laboratory Standards (Preparation and testing of reagent water in the clinical laboratory - second edition; approved guideline C3-A2 Villanova, PA: NCCLS, 1991) include the following specificatlons at time of production:

	Type I	Type II	Type III
Maximum bacterial content (CFU/mL)	10	1000	n/a
Minimum resistivity (megohm-cm)	10 (in-line)	1 0	0.1
Maximum silicate content (mg/L Si02)	0.05	0.1	1.0

Bacteria may inactivate reagents, contribute to total organic contamination, or alter optical properties of test solutions. Resistivity provides a nonspecific measure of the ion content. Silica adversely affects most enzyme determination, as well as electrolyte and trace metal analyses. The NCCLS document provides detailed information on how to test for bacterial content, resistivity, and silicates.

INTENDED USES Type III water is suitable only for glassware washing (but not final rinsing) and as feedwater for a higher grade of water. Type II water is appropriate for microbiology media preparation, histology stains and dyes, reagents to be sterilized, and reagents with

preservatives. Type I water is needed for enzyme assays, ligand assays, trace element and heavy metal assays, reagents without preservatives, quantitative immunofluorescent assays, preparation of standard solutions, and electrophoresis. Other applications, such as high performance liquid chromatography or tissue/cell culture may have additional requirements. Type I water must be used at time of production, and cannot be stored; thus, It cannot be purchased from an outside source

The general laboratory area is supplied with high purity deionized water through the central building purification system. Additionally, the laboratory has its own twin ion exchange water purification system monitored with a Beckman solumeter SM-1. This system supplies the laboratory with reagent quality water routinely measured in the 14-16 megohm range. The system is serviced and monitored by Continental Water Systems of Houston, Inc. (713/468-9621) and managed locally by Mr. Charles Drugg (reached through UTMB Physical Plant, X 1586)

The water quality is checked daily to insure that the readings are in the 14-16 megohm range. If water quality drops below 12 megohms, Physical Plant is contacted and the ion exchange columns are replaced.

Water (TYPE I) provided by this system is used for washing, tissue culture glassware, slides, utensils, and other items which must be scrupulously clean.

Annual testing of a random sample of water is sent out for testing of silicates. Results are recorded in the QC manuals.

NOTE: Water (TYPE I) from this system can be used in rehydration or dilution of tissue culture reagents. Sterile diluents specific for that dehydrate reagents is preferred for these purposes.

Records of filter changes are maintained near instrument.

NOTE: Sterility check of Milli Q Water. Once a week, 1 ml water cultured on LB agar bacteriological plates are incubated for 24 hours. # of colonies to be counted and recorded.

Sterility Check of Milli Q Water (Weekly)
CONDUCTIVITY: Data recorded at each usage

Date	Conductivity	Sample Amt	Sterility Test # Colonies

12/12/96

WATER QUALITY IN PROCEDURES USED IN THE CYTOGENETICS LABORATORY

Chapter in Procedure Manual	Technique	Page	Type Water
III.	PERIPHERAL BLOOD STUDIES	3	I
IV.	FRAGILE X STUDIES	4	I
V.	SYNCHRONIZED BLOOD STUDIES	5	I
VI.	FANCONI'S ANEMIA STUDIES	6	I
VII.	BONE MARROW STUDIES	7	I
VIII.	AMNIOTIC FLUID STUDIES	8	I
IX.	SKIN FIBROBLASTS FOR CHROMOSOME STUDY		I
X.	SKIN FIBROBLASTS FOR METABOLIC STUDY	10	I
XI.	SLIDE-MAKINGING	11	I,II
XII.	FREEZING CELL CULTURES IN LIQUID NITROGEN	12	I
XIII.	THAWING SPECIMENS FROZEN	13	I
XIV.	G (GIEMSA)-BANDING	14	I,II
XV.	THOROUGH DESTAINING OF GIEMSA	15	I,II
XVI.	CHROMOSOME BANDING RESOLUTION	16	I,II
XVII.	QUINACRINE(Q) FLUORESCENT BANDING	17	I,II
XVIII.	C-BANDING (BARIUM HYDROXIDE)	18	I,II
XIX.	SILVER-STAINING (NOR TECHNIQUE)	19	I,II
XX.	DISTAMYCIN A/ DAPI (Dst/DAPI) STAINING	20	I,II
XXI.	R-BANDING	21	I,II
XXII.	SODIUM BORATE BANDING	22	I,II
XXIII.	SISTER CHROMATID EXCHANGE STAINING	23	I,II
XXVII.	DISHWASHING PROCEDURE	27	I,II,III

U.S. FILTER / IONPURE
UNITED STATES FILTER CORPORATION

WATER ANALYSIS LABORATORY
U.S. Filter/Ionpure
10 Technology Drive, Lowell, MA 01851
(800) 875-7873 ext: 2059 (508) 934-3049

December 19, 1995

OMJF79665949 015126C

BOB SMITH
U.S. FILTER/IONPURE
10875 KEMPWOOD, SUITE 1
HOUSTON TX 77043

CUSTOMER NAME: BECKY BURAS
CUSTOMER COMPANY: UNIVERSITY OF TEXAS MEDICAL BRANCH
CUSTOMER CITY/STATE: GALVESTON TX
SAMPLING DATE: 07-DEC-95
SAMPLE DESCRIPTION: MILLI-Q WATER
BILLING INFORMATION: PURCHASE ORDER NUMBER 6030221
IONPURE ID NUMBER: 952734

TEST: SPECIAL ANALYSIS (CATALOG TEST 350 5M)

CONSTITUENT	SAMPLE (MG/L)	DETECTION LIMIT (MG/L)
SILICON (as SiO2)	< 0.050	0.050

NOTE 1: WHEN THE CONSTITUENT LEVEL IS AT OR BELOW THE DETECTION LIMIT OF THE TECHNIQUE EMPLOYED BY THE LABORATORY, THE SYMBOL " < " APPEARS TO THE LEFT OF THE DETECTION LIMIT VALUE. WHEN THERE IS NO DETECTION LIMIT AVAILABLE, "NA" WILL APPEAR IN THE DETECTION LIMIT COLUMN.

NOTE 2: THE ABOVE RESULTS ARE REPRESENTATIVE OF THE WATER SAMPLE ON THE DAY THE TESTS WERE PERFORMED.

THANK YOU FOR CHOOSING U.S. FILTER/IONPURE,

Joseph P. Melisi

J. P. MELISI

MANAGER, WATER ANALYSIS LABORATORY

CERTIFIED LABORATORY M-MA070
THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

U.S.FILTER / IONPURE
UNITED STATES FILTER CORPORATION

WATER ANALYSIS LABORATORY
U.S. Filter/Ionpure
10 Technology Drive, Lowell, MA 01851
(800) 875-7873 ext: 2059 (508) 934-9349

December 19, 1995

LMJF79665961 015126C

BOB SMITH
U.S. FILTER/IONPURE
10875 KEMPWOOD, SUITE 1
HOUSTON TX 77043

CUSTOMER NAME:	BECKY BURAS
CUSTOMER COMPANY:	UNIVERSITY OF TEXAS MEDICAL BRANCH
CUSTOMER CITY/STATE:	GALVESTON TX
SAMPLING DATE:	07-DEC-95
SAMPLE DESCRIPTION:	CITY WATER
WATER SAMPLE SOURCE:	RAW MUNICIPAL WELL WATER
BILLING INFORMATION:	PURCHASE ORDER NUMBER 6030221
IONPURE ID NUMBER:	952735

TEST: SPECIAL ANALYSIS (CATALOG TEST 350 5M)

CONSTITUENT	SAMPLE (MG/L)	DETECTION LIMIT (MG/L)
SILICON (as SiO2)	5.813	0.050

NOTE 1: WHEN THE CONSTITUENT LEVEL IS AT OR BELOW THE DETECTION LIMIT OF THE TECHNIQUE EMPLOYED BY THE LABORATORY, THE SYMBOL " < " APPEARS TO THE LEFT OF THE DETECTION LIMIT VALUE. WHEN THERE IS NO DETECTION LIMIT AVAILABLE, "NA" WILL APPEAR IN THE DETECTION LIMIT COLUMN.

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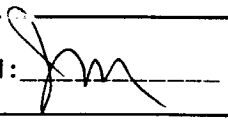
MANAGER, WATER ANALYSIS LABORATORY

CERTIFIED LABORATORY M-MA070

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Approved: 

WASTE DISPOSAL REDUCTION PLAN

The disposal of biohazardous waste is first predicated on the safe elimination of trash to minimize exposure to all personnel. By developing a plan to reduce waste we can also minimize waste. Current practices are designed to produce minimal volumes of liquid waste and burnable waste.

Techniques currently employed to minimize waste:

1.We are continually evaluating improved culture procedures that still promote good cell growth yet reduce liquid media.
2.Culture techniques are monitored to insure a minimal amount of plasticware used.
3.Signs are posted over biohazard waste container to remind people that these receptacles are for biohazardous waste only.